

MICRO-TUBULAR MATERIALS AND MATERIAL/CELL CONSTRUCTS

ABSTRACT OF THE DISCLOSURE

[0078]

The present invention discloses the design and fabrication of highly porous (up to 97%) scaffolds from biodegradable polymers with a novel phase-separation technique to generate controllable parallel array of micro-tubular architecture. The porosity, diameter of the micro-tubes, the tubular morphology and their orientation may be controlled by the polymer concentration, solvent system and temperature gradient. The mechanical properties of these scaffolds are anisotropic. Osteoblastic cells are seeded in these 3-D scaffolds and cultured *in vitro*. The cell distribution and the neo-tissue organization are guided by the micro-tubular architecture. The method has general applicability to a variety of polymers, therefore the degradation rate, cell-matrix interactions may be controlled by the chemical composition of the polymers and the incorporation of bioactive moieties. These micro-tubular scaffolds may be used to regenerate a variety of tissues with anisotropic architecture and properties.

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